National Snow and Ice Data Center
Advancing knowledge of Earth's frozen regions

CIRES

University of Colorado **Boulder**

Cool Apps: Building Cryospheric Data Applications With Standards-Based Service Oriented Architecture

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Outline

1. Introduction
2. The Web, circa 2012
3. 3-tier and Service Oriented Architectures (SOA)
4. Service standards
5. NSIDC apps
6. Proposal

INTRODUCTION

Introduction

The National Snow and Ice Data Center (NSIDC) supports research into our world's frozen realms: the snow, ice, glaciers, frozen ground, and climate interactions that make up Earth's cryosphere.

NSIDC manages and distributes scientific data, creates tools for data access, supports data users, performs scientific research, and educates the public about the cryosphere.

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Introduction

distributes scientific data

creates tools for data access

supports data users

NSIDC

Introduction

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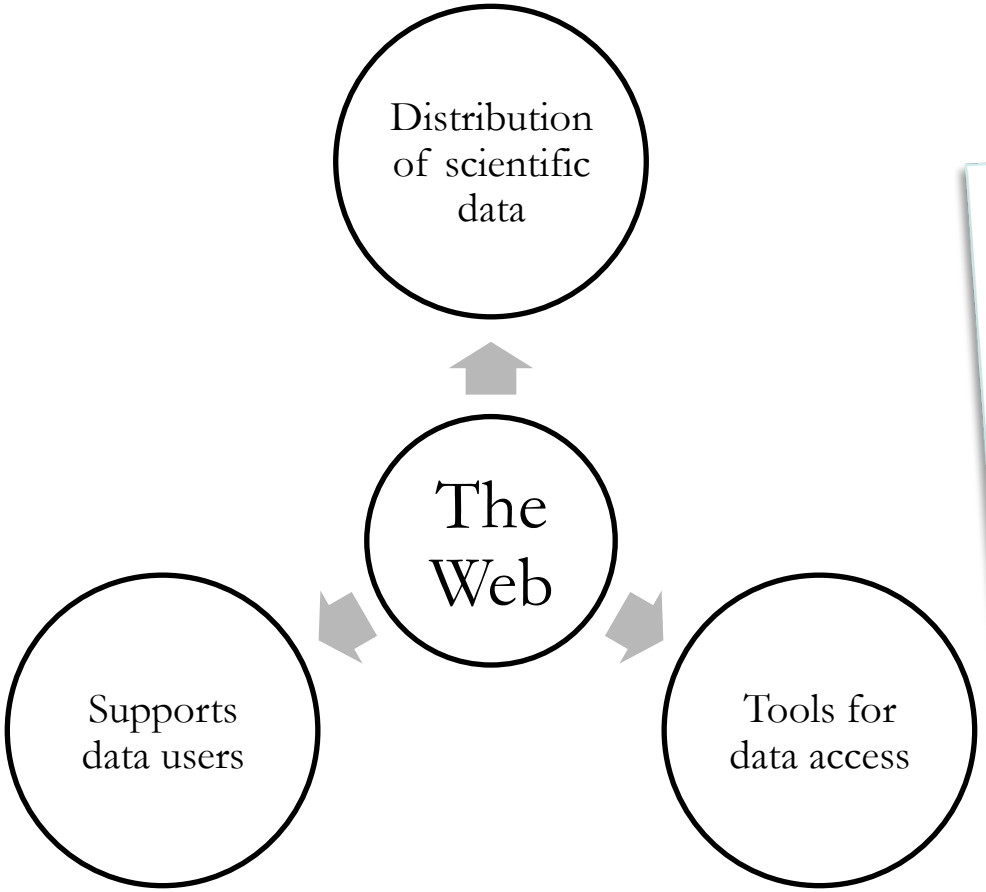
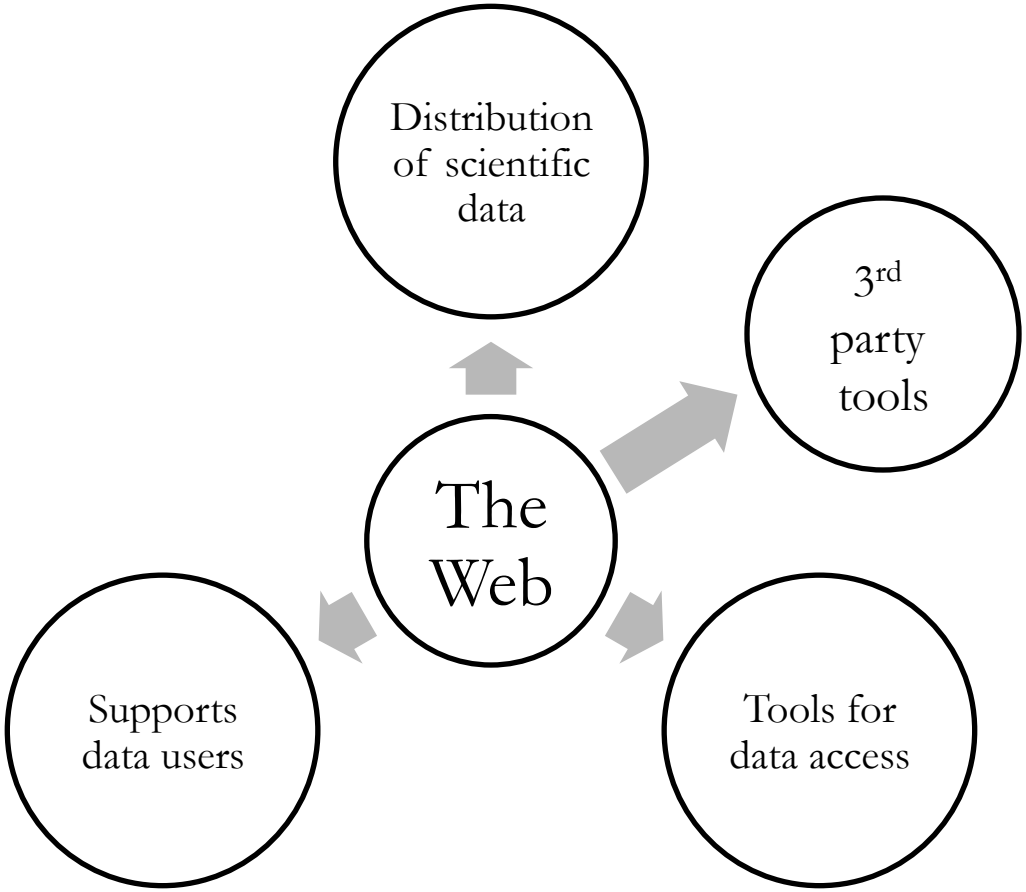
Introduction

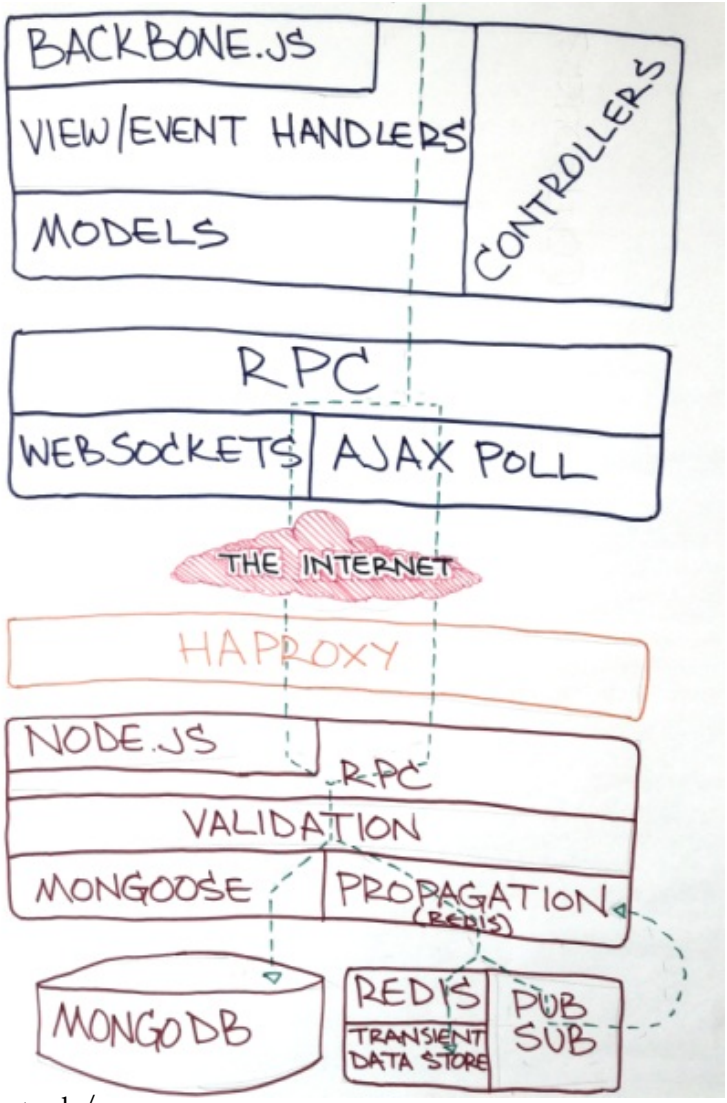


Introduction



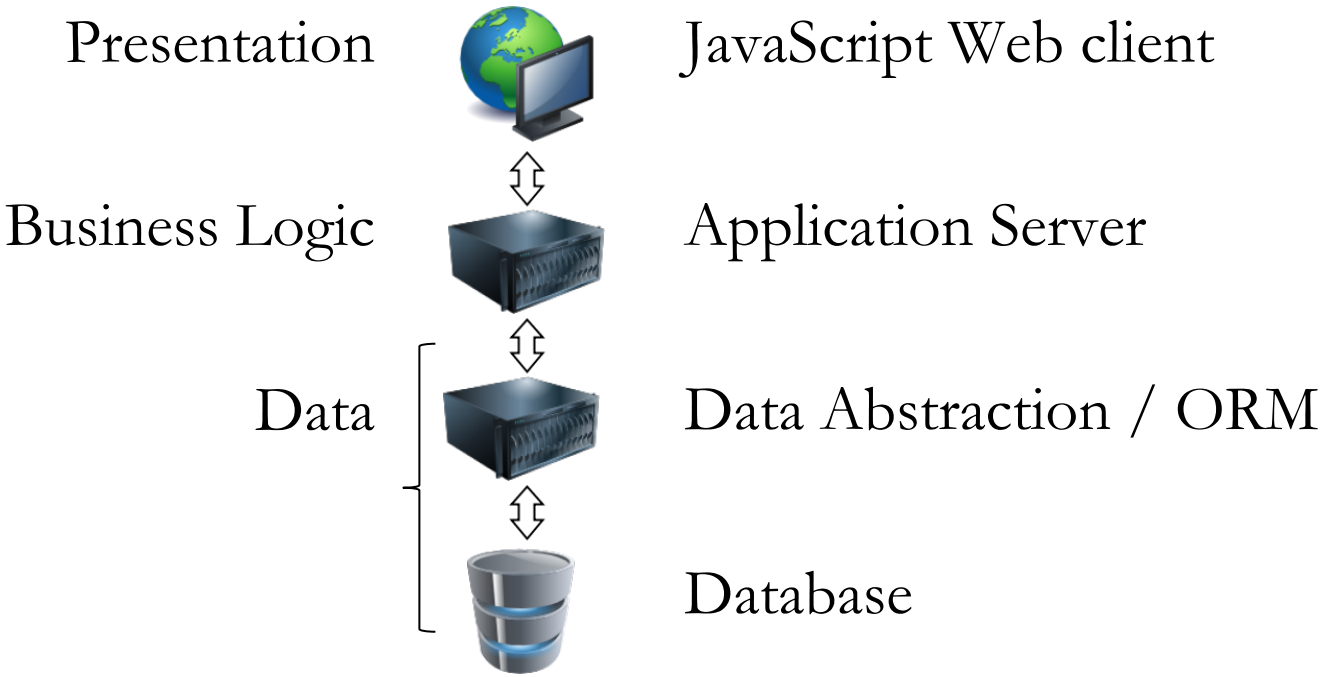
THE WEB

Web Applications



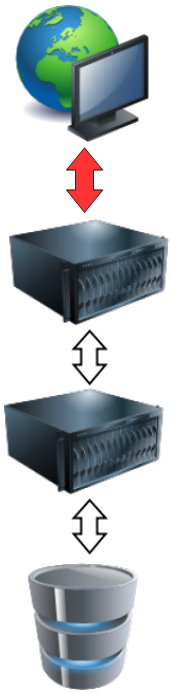
http://blog.fogcreek.com/the-trello-tech-stack/

3-Tier Web Architecture



3-Tier Web Architecture

The Problem:



3-Tier Web Architecture

The Problem:

Tight Coupling

3-Tier Web Architecture

The Problem:

1 user interface requires 1 app stack

3-Tier Web Architecture

The Problem:

…and perhaps

portal

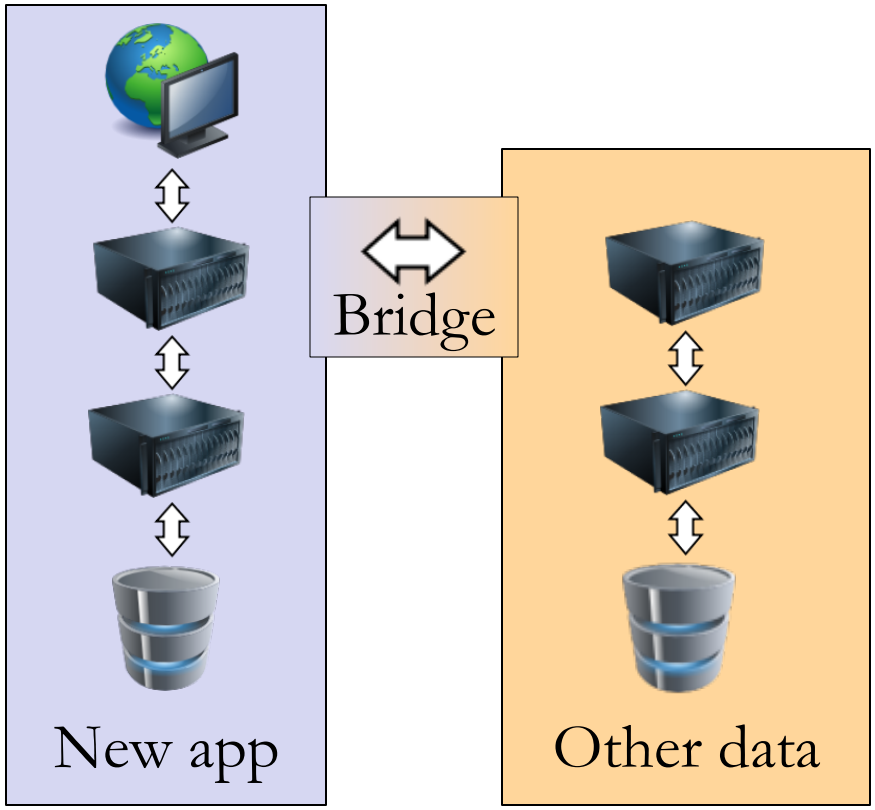
proliferation

problem

3-Tier Web Architecture

Extending…

3-Tier Web Architecture



3-Tier Web Architecture

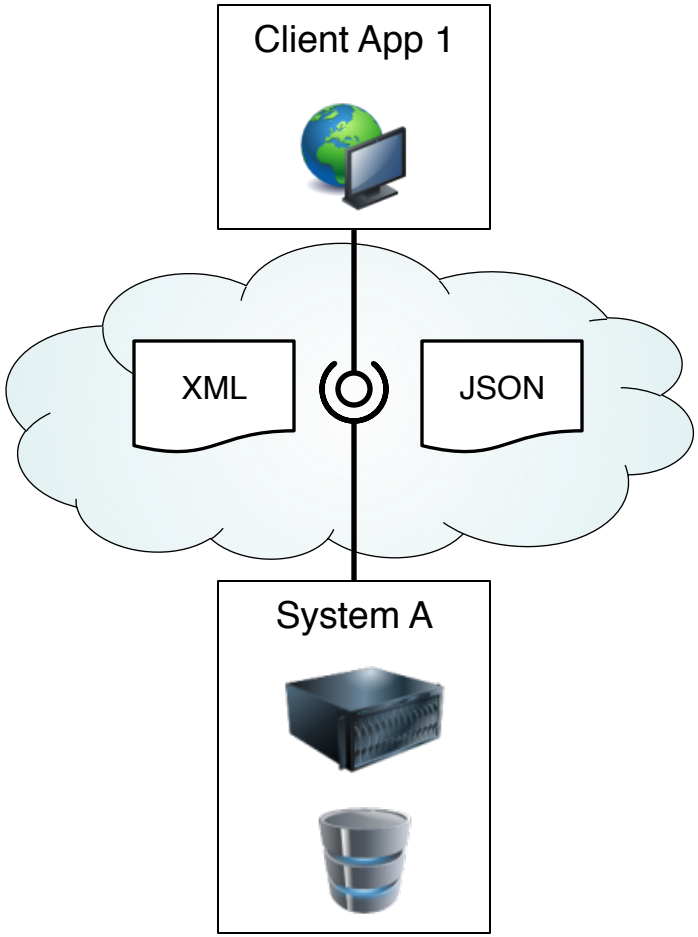
The Problem:

1 user interface requires ≥1 app stack

(hopefully in the same language)


SOA

SOA Web Architecture



Service Interfaces

Clients consume service interfaces

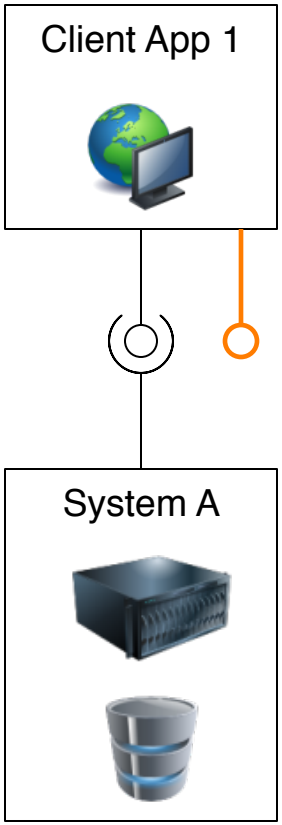
Loose *coupling*

Systems expose service interfaces

Service Interfaces

Extending…

SOA Web Architecture



Service Interfaces

The Problem:

service interface proliferation problem

Service Interfaces and Standards

Clients consume service interfaces

…service interfaces conforming to standards

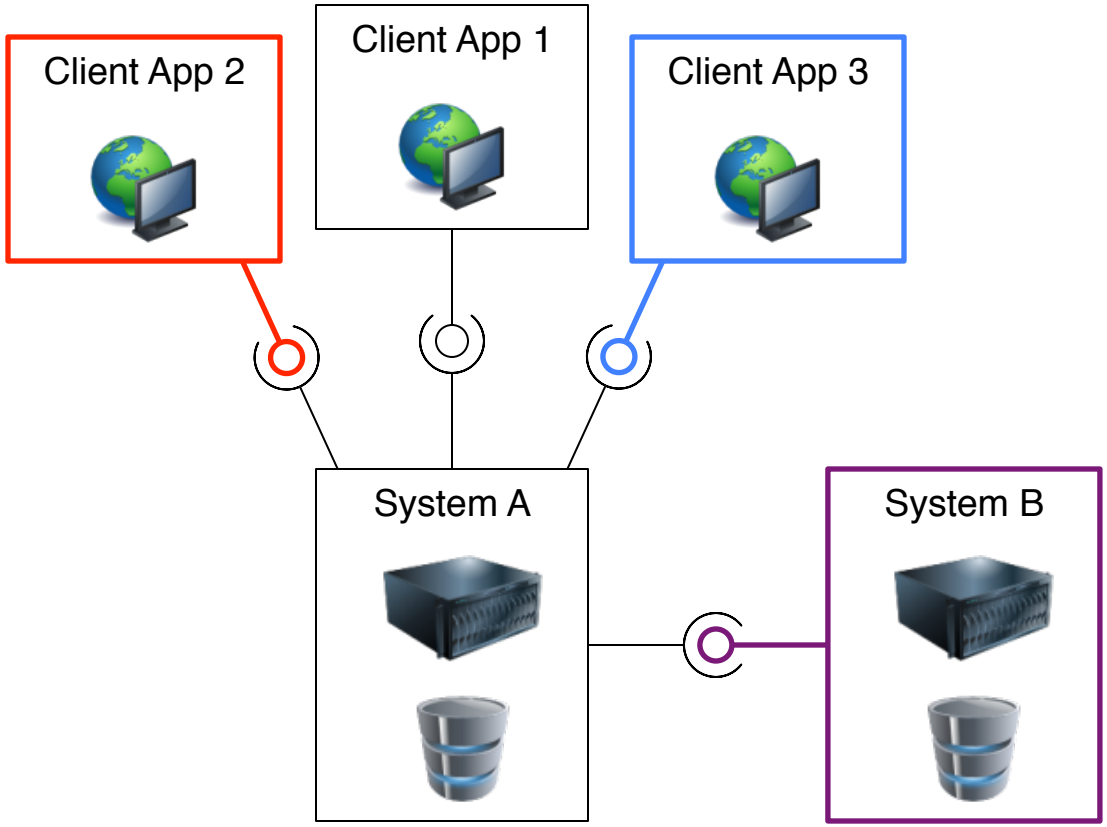
Service Standards

data:	OGC WMS, WFS, WPS, …
	OPeNDAP
	REST
publishing:	ATOM
discovery:	ESIP OpenSearch
metadata:	OAI-PMH

Service Interfaces

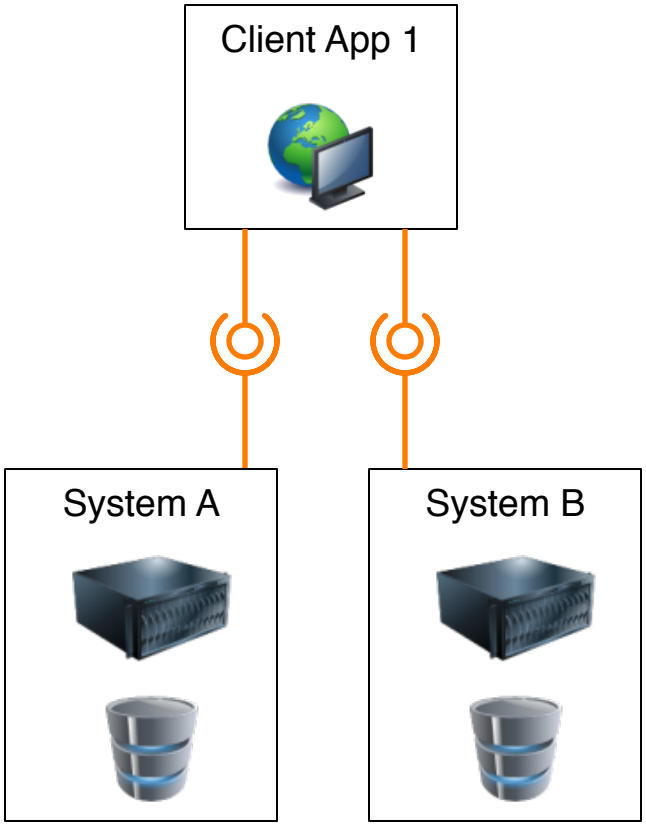
Reusing…

SOA Web Architecture



Many clients…

SOA Web Architecture



Many service providers…

Implementing Services

Adopt

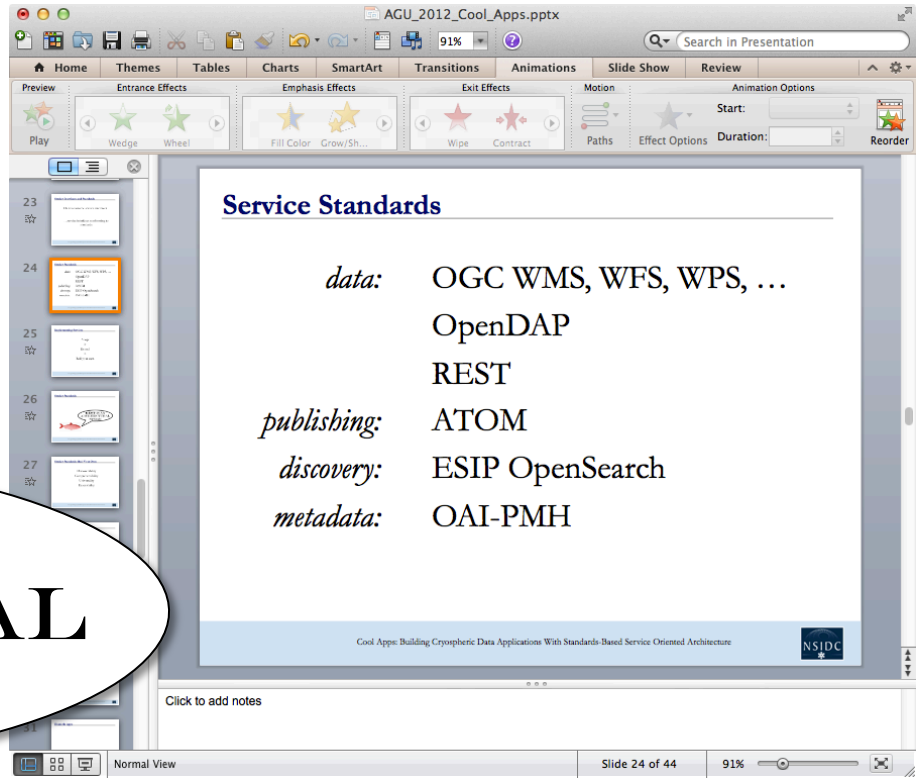
>

Extend

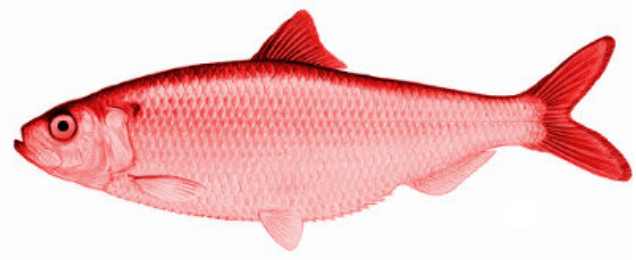
>

Roll your own

Service Standards



REST IS AN ARCHITECTURAL STYLE!



Services: Roll Your Own

Desirable properties include:

Discoverability

Comprehensibility

Universality

Extensibility

Services, RESTfully

Discoverability:

hypermedia constraint, published media types

Comprehensibility:

familiar URIs; media types

Universality:

HTTP transport; XML or JSON payloads

Extensibility:

XML, e.g. ATOM

Implementing Services

Adopt

>

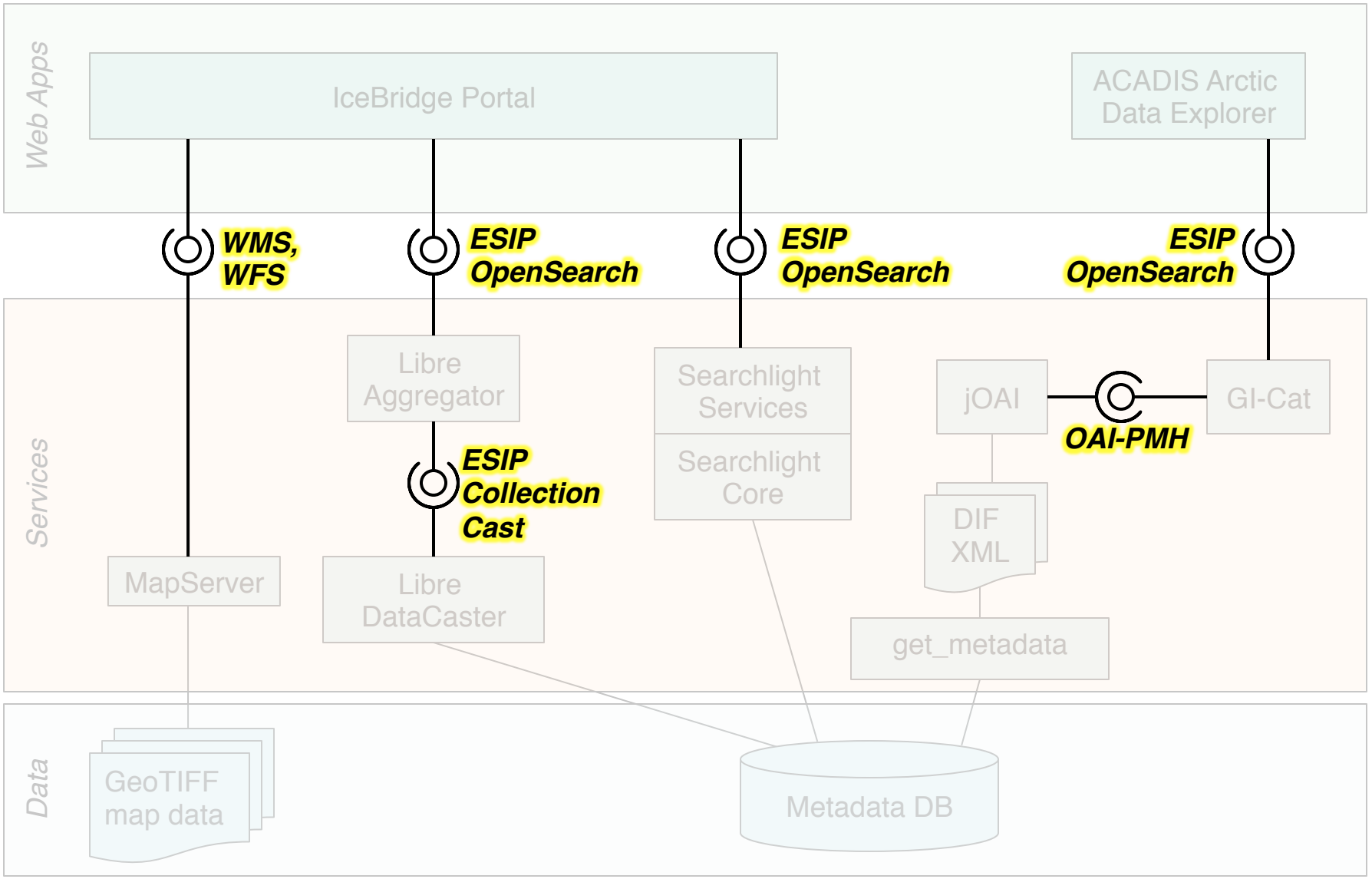
Extend

>

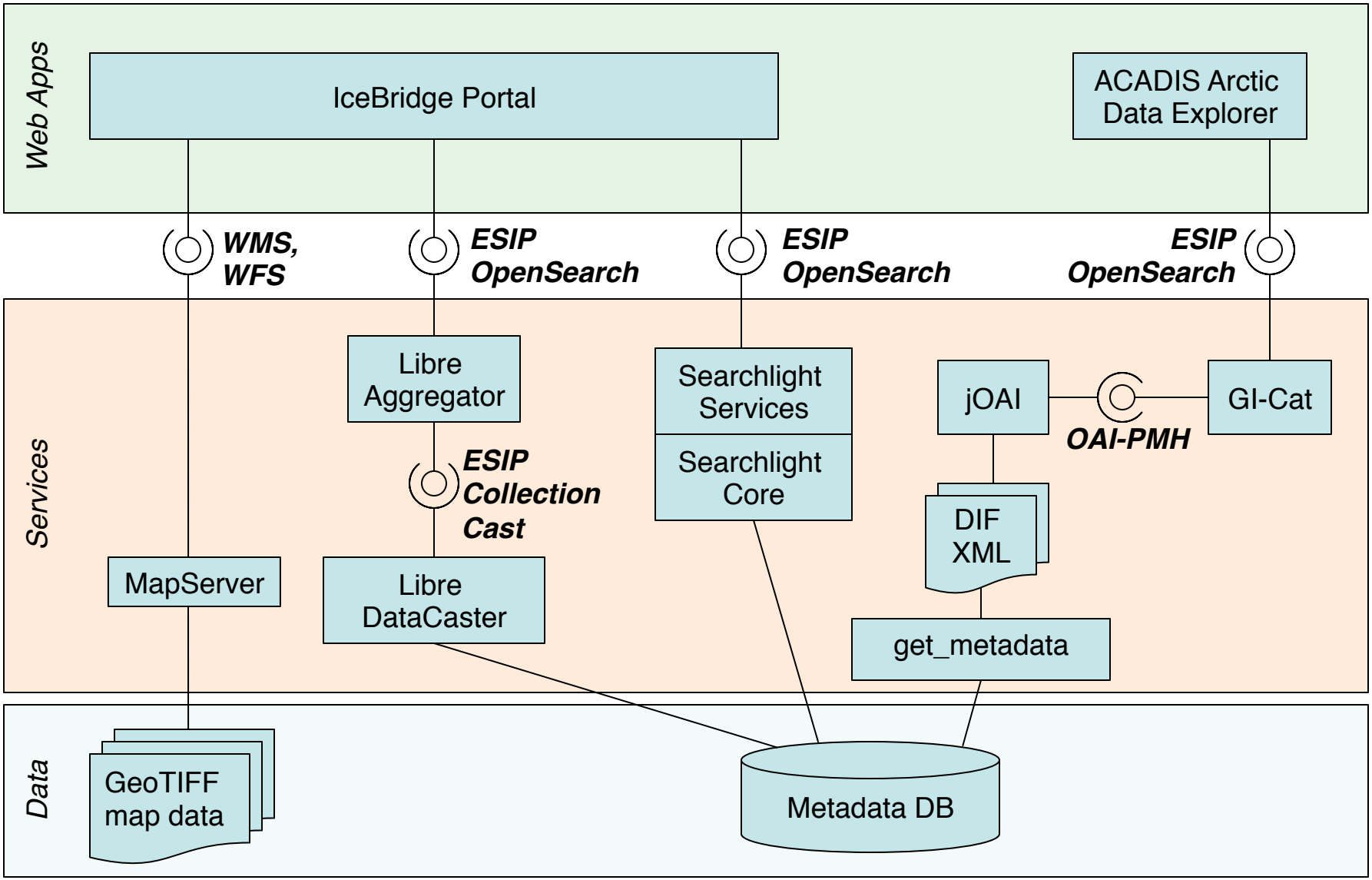
 Roll your own RESTful services

SOA @ NSIDC

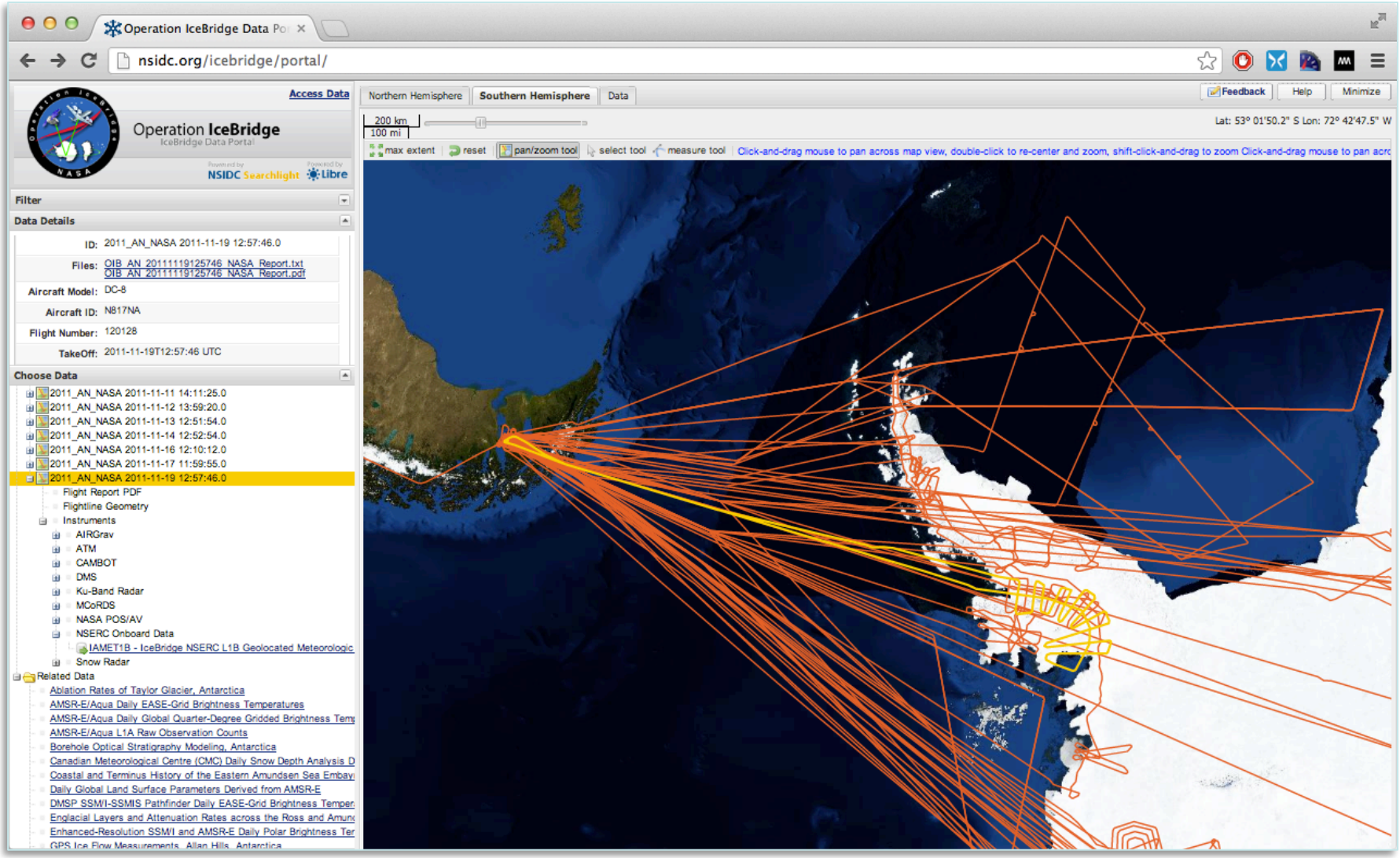
NSIDC's Service Oriented Architecture



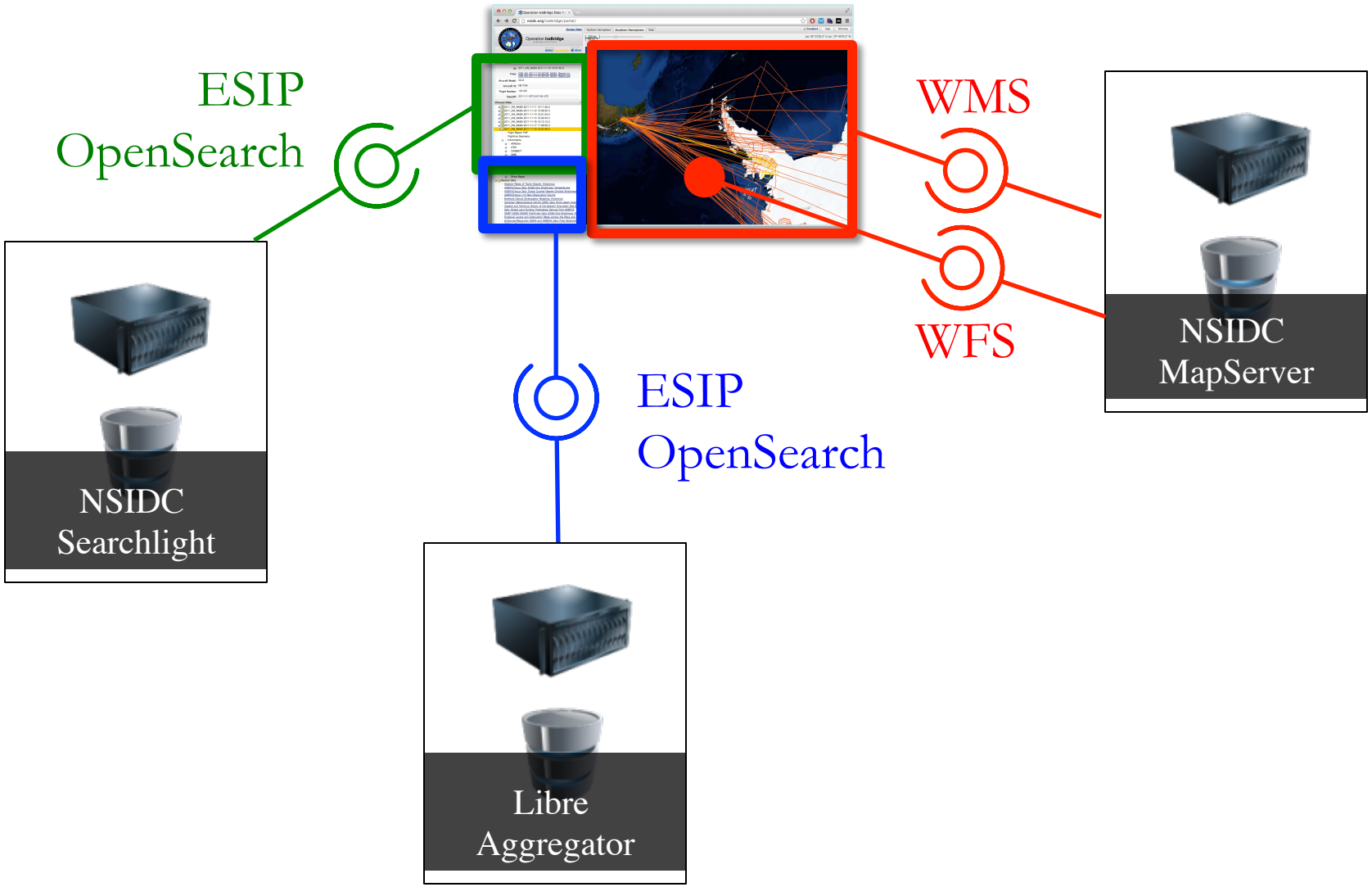
NSIDC's Service Oriented Architecture



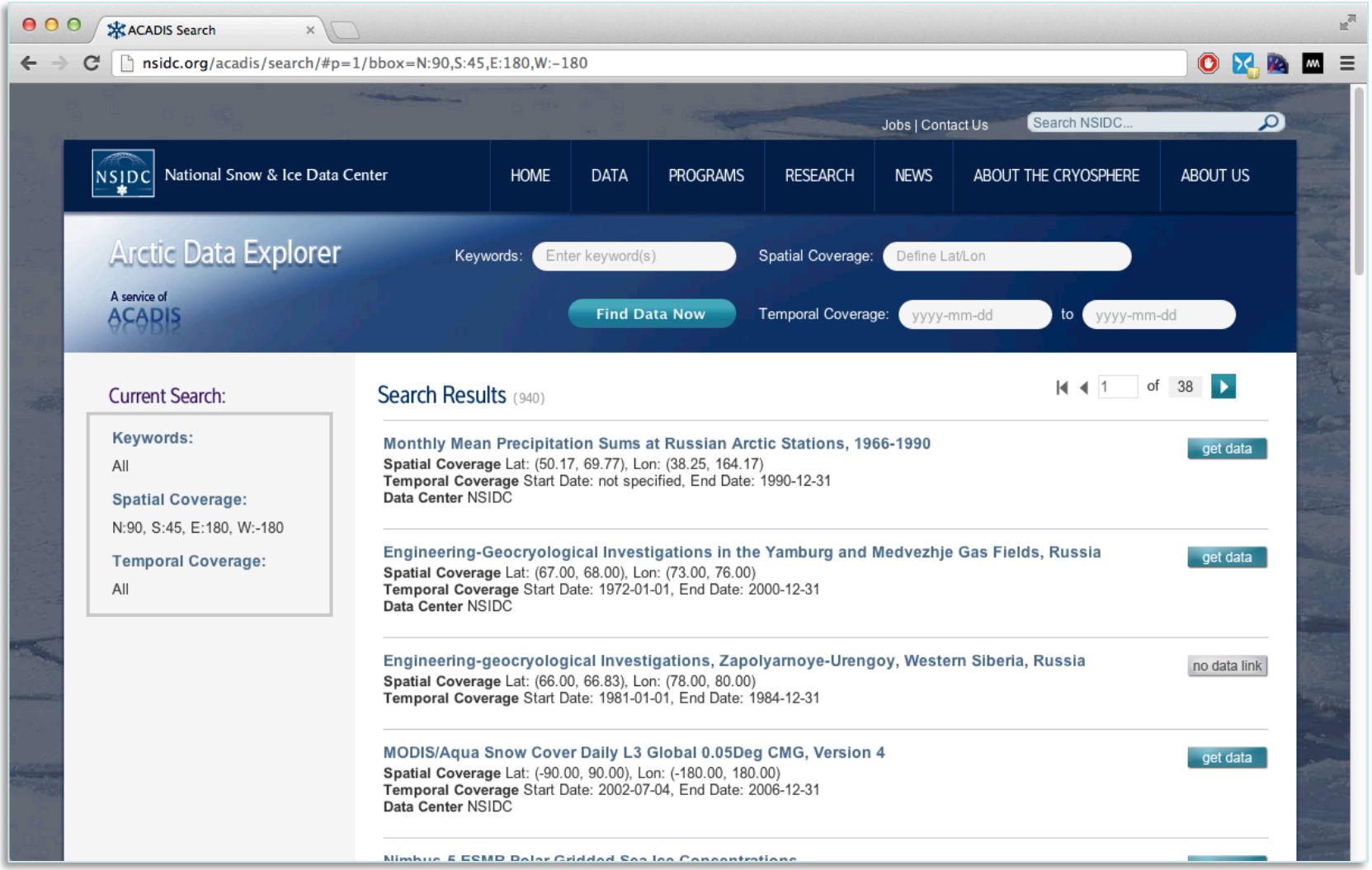
Operation IceBridge Portal



Operation IceBridge Portal



ACADIS Arctic Data Explorer



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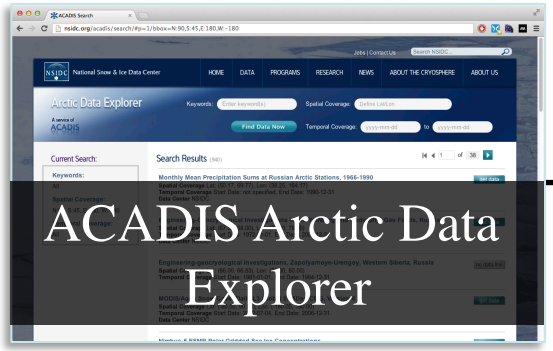


ESIP OpenSearch

OPeNDAP

OAI-PMH

EOL field catalog (NCAR)

NSIDC metadata catalog

Met.no metadata catalog

ACADIS Gateway (NCAR)

+/-/ Δ: OBSERVATIONS

Disadvantages

Complexity

Compromise

Development time

Advantages

Reuse (and reusability)

Off-The-Shelf Software

Development time

Challenges

Documentation

Adoption

Continuity

THE WEB OF SERVICES

The Web of Services

Clients consume service interfaces

The Web of Services

Web clients…

The Web of Services

Web browsers have security restrictions…

("same origin policy")

The Web of Services

My web client

may not consume

your service interface

A MODEST PROPOSAL

Goal

Increase the pool of potential users (web applications) of our data

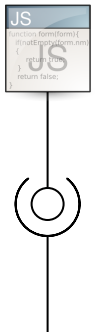
HTML5 Standard: CORS

CORS: Cross Origin Resource Sharing

http://www.w3.org/TR/cors/

http://enable-cors.org/

Proposal



Write service-enabled clients

Build standards-based services

Enable CORS

Share and reuse data and services

Poster

Joe Oldenburg: “Cool Apps”

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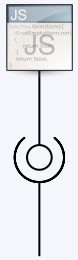
Questions



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Enable CORS

Share and reuse data and services

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this presentation: http://goo.gl/xkxgd